

## MISCELLANEOUS.

*On the Embryogeny and Propagation of Intestinal Worms.* By MM. ERCOLANI and VELLA. Abstract by Prince CHARLES BONAPARTE.

THE recent investigations of German naturalists on the propagation and metamorphoses of the Cestoid worms have already engaged the attention of the Academy, but our authors have occupied themselves with the same phænomena in the Nematoid worms, of which we know scarcely anything.

After combating the most specious arguments that have been advanced in favour of the doctrine of *heterogeny*, they endeavour to show by simple and clearly stated facts, that, in spite of the general opinion, the *Entozoa* enjoy a marvellous tenacity of life. To such an extent does this go, in fact, that their embryos have lived six days immersed in alcohol, and been revived after thirty days of complete dryness.

The embryogeny of the *Ascaris megalcephala* of the horse, hitherto scarcely known, appears to be almost completely elaborated. The artificial development of this worm was effected by Dr. Ercolani in the lung of a dog. The description of these experiments is followed by some new observations in comparative embryogeny relating to the Graafian vesicle, the formation of the chorion and of the vitelline membrane, and especially to the successive development of the organic constituents of the worms.

Lastly, he shows how the ova of the *Nematoids*, after passing into the bodies of animals with their food, insinuate themselves into the walls of the intestine, so that their presence completely escapes detection. In this position these ova undergo a sort of incubation, and the embryo becomes sufficiently developed to return into the intestinal cavity, where it is afterwards to pass its life.

In concluding their memoir the authors give the following *résumé* of their facts:—

1. “The progressive metamorphoses of the *Entozoa*, hitherto studied by Van Beneden, Küchenmeister and Siebold, although revealing to us new and astonishing facts, are not applicable to the entire solution of the questions connected with the genesis of all *Entozoa*.”

2. “Although the retrogressive metamorphosis of the ova of *Tæniæ* into *Cysticerci* and *Cænuri* have not succeeded with the authors as with some other observers, they have nevertheless led them to recognize a lower phase in the development of the *Cysticercus cuniculi*, a phase which approaches this worm to the lowest and most simple worms: although they present an invaginated head, they are destitute of the small openings, the hooks, and the caudal vesicle, so that the opinion entertained by some that the *Cysticerci* are degenerated *Tæniæ* is not well founded.

3. “The Nematoid worms do not undergo anything like a progressive metamorphosis; the changes observable in the embryo are

only phases of development ; thus the generative organs are always the last formed, and are not perfectly presented until the complete development of the animal.

4. "The horny appendages and hooks, which are wanting in the *Cysticercus cuniculi* in the first stages of its development, are also wanting round the mouth of the *Strongylus armatus* until after complete development, and are then formed but slowly.

5. "The eggs of the *Ascaris megalcephala* of the horse may be artificially developed in the pulmonary tissues of the dog.

6. "The cessation of movement and the fluidity of the body in the *Nematoids* are not sufficient signs of the death of these animals, as they recover from this state as soon as they are placed in warm water ; even in the state of embryos, although completely dried up, they return to life very quickly by this means. The Nematoid worms consequently die with great difficulty ; the ova and embryos are endowed with a marvellous tenacity of life ; they even exhibit signs of life after immersion for six days in alcohol of 30 degrees.

7. "This tenacity of life, joined with the power of development of the ovum when placed in circumstances different from those in which it lives naturally, besides giving evidence of new and important facts, destroys the strongest arguments employed by many naturalists in favour of heterogeny.

8. "The ova of the Nematoid worms require a considerable time for their development after being introduced with the food into the bodies of animals ; they adhere at first around the villousities of the mucous membrane of the intestine, whence they afterwards penetrate to the peritoneum, there to complete their development free from all danger of being eliminated, returning afterwards into the cavity of the intestine.

9. "This simple mechanism, in harmony with the laws which govern the introduction of foreign bodies into the organism, may be readily observed by examining the yellowish spots which occur in the intestines of the rabbit, or in the cæcum of the horse, which are nothing but the ova of the *Oxyuris* of the rabbit or of the *Strongylus* of the horse ; amongst these ova we often meet with the microscopic embryos of these *Nematoids*.

10. "In the adult females of the *Ascaris megalcephala* and *lumbricoides* it may readily be shown that the ova are not formed in the last portion of the oviduct, but in the superior, slender portion which represents a true ovary.

11. "From the inner surface of the ovaries of the *Ascarides* just mentioned, an immense quantity of elongated, pyriform bodies are suspended ; these represent the Graafian vesicles of the superior animals.

12. "The Graafian vesicle, as in the higher animals, is not torn to permit the passage of the ovum, but detaches itself completely from the stroma, and loses its pyriform shape to become round, whilst the membrane of the vesicle becomes the chorion of the egg.

12. "The vitelline membrane is formed after the detachment of the ovum."—*Comptes Rendus*, 24th April 1854, p. 779.